CLAIMS

1. An antifuse, comprising:

a lower electrode layer;

a dielectric layer disposed on said lower electrode layer;

a non-conductive hemispherical grain layer formed on said dielectric layer; and

an upper electrode disposed on said non-conductive hemispherical grain layer.

2. The antifuse of Claim 1, wherein said dielectric layer is disposed in physical communication with said non-conductive hemispherical grain layer and said lower electrode layer.

3. The antifuse of Claim 1, wherein said dielectric layer has at least one planar surface.

4. The antifuse of Claim 1, wherein said non-conductive hemispherical grain layer comprises amorphous Si.

5. The antifuse of Claim 1, wherein said non-conductive hemispherical grain layer comprises amorphous SiGe.

6. The antifuse of Claim 1, wherein said non-conductive hemispherical grain layer comprises amorphous carbon.

7. The antifuse of Claim 6, wherein said amorphous carbon of said non-conductive hemispherical grain layer is doped with at least one of hydrogen and fluorine.

8. The antifuse of Claim 1, wherein said non-conductive hemispherical grain layer is disposed between two layers of an adhesion-promoting material.

9. The antifuse of Claim 1, wherein said dielectric layer and said non-conductive hemispherical grain layer form a dielectric element.

10. The antifuse of Claim 9, wherein said dielectric element is about 5 Å to about 200 Å in thickness.

11. The antifuse of Claim 1, wherein said non-conductive hemispherical grain layer is about 100 Å to about 500 Å in thickness.

12. A method of forming an antifuse, comprising:

disposing a dielectric layer on a lower electrode layer;

forming a non-conductive hemispherical grain layer on said dielectric layer; and

disposing an upper electrode on said non-conductive hemispherical grain layer.

13. The method of Claim 1, wherein said dielectric layer is in physical communication with said non-conductive hemispherical grain layer and said lower electrode layer.

14. The method of Claim 12, wherein said dielectric layer has at least one planar surface.

15. The method of Claim 12, wherein said non-conductive hemispherical grain layer comprises amorphous Si.

16. The method of Claim 12, wherein said non-conductive hemispherical grain layer comprises amorphous SiGe.

17. The method of Claim 12, wherein said non-conductive hemispherical grain layer comprises amorphous carbon.

18. The method of Claim 17, wherein said amorphous carbon of said non-conductive hemispherical grain layer is doped with at least one of hydrogen and fluorine.

19. The method of Claim 12, wherein said non-conductive hemispherical grain layer is disposed between two layers of an adhesion-promoting material.

20. The method of Claim 12, wherein said dielectric layer and said non-conductive hemispherical grain layer form a dielectric element.

21. The method of Claim 20, wherein said dielectric element is about 5 Å to about 200 Å in thickness.

22. The method of Claim 12, wherein said non-conductive hemispherical grain layer is about 100 Å to about 500 Å in thickness.

23. The method of Claim 12, wherein said forming said non-conductive hemispherical grain layer includes vacuum annealing said non-conductive hemispherical grain layer.

24. The method of Claim 12, wherein said forming said non-conductive hemispherical grain layer includes use of a process selected from the group consisting of a vacuum anneal process, a low-pressure chemical vapor deposition process, and an *in-situ* annealing process.